

chromium-vanadium, may be converted to graphite.

(c) [Reserved]

(d) The design temperature of a piping system employing one or more of the materials listed in paragraphs (a), (b), and (c) of this section shall not exceed the lowest graphitization temperature specified for materials used.

[CGFR 68–82, 33 FR 18843, Dec. 18, 1968, as amended by CGFR 69–127, 35 FR 9978, June 17, 1970; CGD 72–104R, 37 FR 14233, July 18, 1972; CGD 73–248, 39 FR 30839, Aug. 26, 1974; CGD 73–254, 40 FR 40165, Sept. 2, 1975]

#### § 56.60–10 Cast iron and malleable iron.

(a) The low ductility of cast iron and malleable iron should be recognized and the use of these metals where shock loading may occur should be avoided. Cast iron and malleable iron components shall not be used at temperatures above 450 °F. Cast iron and malleable iron fittings conforming to the specifications of Table 56.60–1(a) of this part may be used at pressures not exceeding the limits of the applicable standards of Table 56.60–1(b) of this part at temperatures not exceeding 450 °F. Valves of either of these materials may be used if they conform to the standards for class 125 and class 250 flanges and flanged fittings in ANSI B16.1 and if their service does not exceed the rating as marked on the valve.

(b) Cast iron and malleable iron shall not be used for valves or fittings in lines carrying flammable or combustible fluids<sup>1</sup> which are directly connected to, or in the proximity of, equipment or other lines having open flame, or any parts operating at temperatures above 500 °F. Cast iron shall not be used for hull fittings, or in systems conducting lethal products.

(c) Malleable iron and cast iron valves and fittings, designed and marked for Class 300 refrigeration service, may be used for such service provided the pressure limitation of 300 pounds per square inch is not exceeded. Malleable iron flanges of this class

may also be used in sizes 4 inches and smaller (oval and square design).

[CGFR 68–82, 33 FR 18843, Dec. 18, 1968, as amended by CGFR 69–127, 35 FR 9978, June 17, 1970; CGD 73–254, 40 FR 40165, Sept. 2, 1975; CGD 77–140, 54 FR 40612, Oct. 2, 1989; CGD 95–027, 61 FR 26001, May 23, 1996]

#### § 56.60–15 Ductile iron.

(a) Ductile cast iron components made of material conforming to ASTM A 395 (incorporated by reference, see § 56.01–2) may be used within the service restrictions and pressure-temperature limitations of UCD–3 of section VIII of the ASME Code.

(b) Ductile iron castings conforming to ASTM A 395 (incorporated by reference, see § 56.01–2) may be used in hydraulic systems at pressures in excess of 7500 kilopascals (1000 pounds per square inch) gage, provided the following:

(1) The castings receive a ferritizing anneal when the as-cast thickness does not exceed one inch;

(2) Large castings for components, such as hydraulic cylinders, are examined as specified for a casting quality factor of 90 percent in accordance with UG–24 of section VIII of the ASME Code; and

(3) The castings are not welded, brazed, plugged, or otherwise repaired.

(c) After machining, ductile iron castings must be hydrostatically tested to twice their maximum allowable working pressure and must show no leaks.

(d) Ductile iron castings exhibiting less than 12 percent elongation in 50 millimeters (2 inches) when subjected to a tensile test must meet the requirements for cast iron in this part.

[CGD 77–140, 54 FR 40612, Oct. 2, 1989, as amended by CGD 95–027, 61 FR 26001, May 23, 1996; USCG–2000–7790, 65 FR 58460, Sept. 29, 2000]

#### § 56.60–20 Nonferrous materials.

Nonferrous materials listed in this subpart may be used in piping systems under the following conditions (see also § 56.10–5(c)):

(a) The low melting points of many nonferrous metals and alloys, such as aluminum and aluminum alloys, must be recognized. These types of heat sensitive materials must not be used to

<sup>1</sup>For definitions of flammable or combustible fluids, see §§ 30.10–15 and 30.10–22 of subchapter D (Tank Vessels) of this chapter.

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conduct flammable, combustible, or dangerous fluids, or for vital systems unless approved by the Marine Safety Center.

NOTE: For definitions of flammable or combustible fluids, see §§ 30.10-15 and 30.10-22 or parts 151-154 of this chapter. Dangerous fluids are those covered by regulations in part 98 of this chapter.

(b) The possibility of galvanic corrosion due to the relative solution potentials of copper and aluminum and their alloys should be considered when used in conjunction with each other or with steel or with other metals and their alloys when an electrolyte is present.

(c) A suitable thread compound must be used in making up threaded joints in aluminum pipe to prevent seizing which might cause leakage and perhaps prevent disassembly. Pipe in the annealed temper should not be threaded.

(d) The corrosion resistance of copper bearing aluminum alloys in a marine atmosphere is poor and alloys with copper contents exceeding 0.6 percent should not be used. Refer to Table 56.60-2(a) of this part for further guidance.

[CGFR 68-82, 33 FR 18843, Dec. 18, 1968, as amended by CGD 77-140, 54 FR 40612, Oct. 2, 1989; CGD 95-027, 61 FR 26001, May 23, 1996]

### § 56.60-25 Nonmetallic materials.

(a) Plastic pipe installations shall be in accordance with the International Maritime Organization (IMO) resolution A.753(18), Guidelines for the Application of Plastic Pipes on Ships and the following supplemental requirements:

(1) Materials used in the fabrication of plastic pipe shall comply with the appropriate standards listed in § 56.01-2 of this chapter.

(2) Plastic pipe is not permitted in a concealed space in an accommodation or service area, such as behind ceilings or linings or between double bulkheads, unless—

(i) Each trunk or duct containing such piping is completely surrounded by “A” class divisions; or

(ii) An approved smoke-detection system is fitted in the concealed space and each penetration of a bulkhead or deck and each installation of a draft stop is made in accordance with IMO

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resolution A.753(18) to maintain the integrity of fire divisions.

(3) Plastic pipe used outboard of the required metallic shell valve in any piping system penetrating the vessel's shell (see § 56.50-95(f)) shall have the same fire endurance as the metallic shell valve. Where the shell valve and the plastic pipe are in the same un-manned space, the valve shall be operable from above the freeboard deck.

(4) Pipe that is to be used for potable water shall bear the seal of approval or NSF mark of the National Sanitation Foundation Testing Laboratory, Incorporated, School of Public Health, University of Michigan, Ann Arbor, MI 48103.

(b) *Nonmetallic flexible hose.* (1) Nonmetallic flexible hose must be in accordance with SAE J-1942 and may be installed only in vital and nonvital fresh and salt water systems, nonvital pneumatic systems, lube oil and fuel systems, and fluid power systems.

(2) Nonmetallic flexible hose may be used in vital fresh and salt water systems at a maximum service pressure of 150 psi. Nonmetallic flexible hose may be used in lengths not exceeding 30 inches where flexibility is required subject to the limitations of paragraphs (a) (1) through (4) of this section. Nonmetallic flexible hose may be used for plastic pipe in duplicate installations in accordance with paragraph (a) of this section.

(3) Nonmetallic flexible hose may be used for plastic pipe in nonvital fresh and salt water systems and nonvital pneumatic systems subject to the limitations of paragraphs (a) (1) through (4) of this section. Unreinforced hoses are limited to a maximum service pressure of 50 psi, reinforced hoses are limited to a maximum service pressure of 150 psi.

(4) Nonmetallic flexible hose may be used in lube oil, fuel oil and fluid power systems only where flexibility is required and in lengths not exceeding 30 inches.

(5) Nonmetallic flexible hose must be complete with factory-assembled end fittings requiring no further adjustment of the fittings on the hose, except that field attachable type fittings may be used. Hose end fittings must comply